

NAVAL TORPEDO STATION, FIRING PIER
(Building No. 35)

North end of Gould Island, in Narragansett Bay
Newport
Newport County
Rhode Island

HAER No. RI-38-A

HAER
RI
3-NEWP,
81A-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Northeast Region
U.S. Custom House
200 Chestnut Street
Philadelphia, PA 19106

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HISTORIC AMERICAN ENGINEERING RECORD
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LOCATION: North end of Gould Island, in Narragansett Bay, Newport, Newport County, Rhode Island.

U.S.G.S. Prudence Island, R.I. Quadrangle, 1:24,000.
UTM: 19.304270.4601100

DATE OF CONSTRUCTION: 1942-3

ENGINEER: John Brackett, New York City, Consulting Engineer to United States Navy, Bureau of Yards and Docks

PRESENT OWNER: United States Department of the Navy, Naval Undersea Warfare Center, Division Newport, Rhode Island

PRESENT USE: Torpedo testing on underwater range

SIGNIFICANCE: The firing pier is part of a complex built by the Navy during the World War II expansion of the Naval Torpedo Station at Newport, Rhode Island. This complex, located at the north end of Gould Island, served as the third element in an operational triad consisting of research and development, storage and disbursal (at Coddington Cove), manufacture (Goat Island) and range testing (Gould Island). As its name suggests, the firing pier was essentially a large platform from which torpedoes were launched into an underwater testing range in Narragansett Bay. At its height, the Gould Island complex was capable of firing 100 torpedoes per day, operating seven days a week round the clock. After the war, the firing pier was used primarily to test experimental models.

PROJECT INFORMATION: The firing pier was recorded under provisions of a Memorandum of Agreement between the Rhode Island State Historic Preservation Office and Northern Division, Naval Facilities Engineering Command, Philadelphia. Portions of the firing pier are scheduled for removal as part of a pollution abatement program. This documentation was prepared by the Cultural Resource Group of

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Louis Berger & Associates, Inc., East Orange, New Jersey.
Project personnel included Martha H. Bowers, Senior
Architectural Historian; and Rob Tucher, Senior
Photographer.

I. DESCRIPTION

The structure designated Building 35 at today's Naval Undersea Warfare Center, Division Newport (NUWC), is a torpedo firing pier situated at the north end of Gould Island. The island, lying in Narragansett Bay about 1 1/2 miles off the west coast of Middletown, Rhode Island, is about 3000 feet long and less than 1000 feet wide, containing about 50 acres. The center and southern portions of the island, now under the jurisdiction of the Rhode Island Department of Environmental Management, are heavily overgrown, as the land is managed primarily as wildlife habitat. From the water, visible remains of former Navy activities at the south end of the island include a seaplane ramp, the ruins of a degaussing station, and torpedo storage facilities. The northern third of the island, still under Navy jurisdiction, contains the remains of the torpedo overhaul and testing facility built in association with the development of Coddington Cove as an annex to the Naval Torpedo Station in 1942-43. These remains include Building 32 (overhaul shops), Building 33 (power plant), and Building 34 (acetylene building). A rubble-filled pier enclosed with steel sheet piling extends into the bay off the north end of the island to Building 35 (firing pier). A timber pile finger pier built off the east side of the firing pier forms a small harbor. Buildings 32 and 35 are joined by a wood-framed, corrugated-metal clad approach, approximately 535 feet long, that originally served as a covered passage and utilidor between the two buildings. Buildings 32, 33, 34 and the approach have been abandoned for nearly 20 years. Most of Building 35 has been either abandoned or sealed, but the north end of the first level is still in occasional use.

The substructure of the firing pier is a series of massive reinforced concrete bents set approximately 18 feet apart on centers which support a 68-foot-wide reinforced concrete deck at 10 feet above mean low water. The building has a total length of about 458 feet, with a club-shaped footprint. The "handle", extending north from the approach, is about 288 feet long and 42 feet wide. The "head", at the extreme north end, measures about 82 feet wide and 169 feet long. The south end of the "handle" (about 108 feet long) contains only one story, about 18 feet high. The remainder of the firing pier is surmounted by a low (10 foot) second level.

The firing pier has a steel structural frame. The perimeter posts are enclosed within the building's one-foot-thick brick exterior walls, while the I-beams carrying the concrete slab floor of the second level and the roof are encased in concrete. The exterior walls are regularly divided into large bays which contain boarded-up remnants of triple- or double-hung wooden window sash or (in the south end) high, wide sliding doors built up from 1" x 8" lumber. A continuous brick sill forms a beltcourse between first and second levels. The flat roofs are edged with low brick parapets which in places still retain original glazed cast concrete coping. The second level is accessed from two (originally three) exterior steel staircases positioned on the east and west elevations toward the north end of the pier. The stair on the west side is enclosed, while the stair on the west side (a replacement of the original) is open to the elements.

A receiving platform (designated on plans as an "unloading dock" and also known as the recovery pier) extends along the east side, the full 288-foot length of the "handle" portion of the building. Steel I-beam brackets remain from the canopy which originally sheltered this dock. A modern jib crane is positioned on the dock.

There were originally two additional levels, rising at the extreme north end of the firing pier. Both were embellished with rusticated brickwork in bands across all four elevations, and the fourth level, utilized as an observation deck, was illuminated by long bands of plate glass windows. Both these levels were removed in the 1980s. At the same time, the entire northern end, or "head", of the firing pier was coated with stucco, because the exterior brickwork had too greatly deteriorated to be effectively repaired. The first story windows on east and west sides of the stuccoed section were removed and the openings sealed. Second story windows in this section were boarded up, as well.

The first level of the firing pier was originally built as one continuous space. A concrete block wall with metal roll door now secures the north end of the pier from the abandoned south end. The exposed ceiling of this level is festooned with ductwork for electric, steam and water lines; several generations of lighting fixtures, including fluorescent and more recently-installed high-pressure sodium elements; and I-beam tracks for travelling hoists. The long, narrow rear section of the first level has no internal partitions, as it served chiefly as a continuation of the approach from the overhaul shop and as a receiving area for ordnance and equipment unloaded from ships along the adjacent receiving dock. The large space at the north end of this level contains several small subdivisions. At the southwest corner, stud- and battened-pressboard walls about 12 feet high enclose two air compressors, one of which is no longer in service. At the southeast corner, full-height cinder block walls, erected in the early 1980s, enclose the diesel-powered generators that today provide electric power on the pier. North of this generating room is a free-standing stud-framed office module, four bays square, with linoleum floor and aluminum window sash.

At the extreme north end of this first level, the north wall is pierced by four 6' x 9' openings, the upper portions of which are glazed and barred, the lower portions stoutly enclosed with wood. These openings originally accommodated the muzzles of deck- or "above-water" torpedo firing tubes, one of which remains present although no longer in service. To the rear of this firing tube is a floor-mounted roller tray. Suspended above and behind each of the four concrete pads on which the firing tubes were mounted are remains of I-beam tracks for hoists that were used to move torpedoes onto the roller trays, from which they were inserted into the tubes. The hoists were also used to load torpedoes directly from wheeled carts, or to install or replace the tubes themselves. The internal structural pier immediately behind this firing area encloses a wooden dumb waiter for conveying gyroscopes and performance indicators from the level above.

The northeast and northwest corners of this first level are secured by heavy steel doors which have replaced original curved wooden sliding doors. These doorways open onto steel-framed towers positioned off the northeast and northwest corners of the firing pier. Each of these

towers constitutes the supporting framework for an open platform elevator of Otis manufacture. At the top of each tower is a small, flat-roofed machine house, of sturdy wood frame construction now clad with asbestos board. Original machinery, including cable drums, sheave wheels and counterweights, was removed from both houses during upgrading efforts in the 1970s and 1980s. During testing these elevators carry submersible torpedo tubes which can be lowered for underwater firing. (At the time of this writing, only the northeast or "starboard" elevator is functional.)

The second level of the firing pier was built to house a full complement of Navy personnel during the round-the-clock operations of wartime. The plan of this level is hierarchically arranged according to rank. At the north end of the floor, officers' and Chief Petty Officers' quarters are arranged along the east and west walls along two parallel corridors that flank a central work area. The work area originally included a wardroom (set off from the adjacent corridor by a wood and glass partition and commanding a fine view north across the torpedo range), wardroom pantry and linen locker, gyroscope room, room for working with "depth and roll" indicators, a machine shop, ordnance room, and armory. The middle portion of the second level plan is bisected by a central corridor. Off the west side of this corridor are the CPO mess, crew mess and crew recreation room (again hierarchically arranged from north to south). Off the east side of the corridor are the galley, commissary storeroom, boatswain's locker, crew head and crew washroom. Crew quarters, occupying the long southern end of the second level plan, consist of a single large open bay which would have been filled with beds in neat rows.

All the various spaces on this second floor are finished in strictly utilitarian fashion, with linoleum flooring, painted walls, and ceilings with exposed, concrete-encased beams. Windows lack trim of any kind, while wooden doors (commonly fitted with rectangular louvered vents) are set in metal surrounds installed flush with the walls. Officers' and CPO quarters are largely indistinguishable, each room fitted with a plain porcelain sink and wall-mounted metal cabinet for toiletries (although the floor plans show that CPOs were billeted two to a room, while officers enjoyed single quarters). Spaces devoted to food preparation and consumption feature tan glazed tile dados about five feet high. A closet containing wooden rifle racks constitutes almost the only physical evidence of how various spaces within the work area were originally utilized.

The third floor, no longer extant, was accessed by two interior flights of stairs from the second floor near the wardroom. (These staircases now lead to the roof.). The third floor contained three rooms, arranged in a file across the north end of the building, consisting of a torpedo records office (with radio room in the southwest corner), a data computing room (equipped with desks, tables and chairs) and an office. The fourth level, also no longer extant, consisted of a single long room serving as the pier's observation deck. It was originally equipped with a catwalk around all four sides.

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Electric power, water and steam were originally supplied from the power plant (Building 33) through conduits run through the frame approach to the firing pier. As indicated earlier in this section, electric power is now generated (on an as-needed basis) by diesel units installed in the firing pier itself. There is no longer any provision for water or steam.

II. HISTORICAL INFORMATION

Building 35 was an integral element of the Gould Island complex built in 1942-43 for the Range Division of the Naval Torpedo Station's Military and Range Department. The complex, designed in 1941 by John Brackett of New York City, consulting engineer, for the Navy's Bureau of Yards and Docks, included an overhaul shop (Building 32), power plant (Building 33), acetylene building (Building 34) and firing pier (Building 35) along with ancillary features such as the frame approach, ferry slip, and timber-pile finger pier. The scale of the Gould Island facility reflected the enormous scale of wartime operations at the Naval Torpedo Station, which included production of about 17,000 torpedoes and proof-firing of some 75,000 torpedoes (both those produced locally and those manufactured at plants elsewhere in the US) between 1941 and 1945 ("NUSC on Torpedoes" 1988: 18). Like the rest of the Torpedo Station during the war, its Range Division operated 24 hours a day, seven days a week. A largely civilian work force (about 500 people on each of three shifts) was brought to the island by ferry to staff the big shop building, where torpedoes were readied for ranging or overhauled following completion of a test. At its height, the Gould Island complex was capable of range proofing 100 torpedoes a day, or one every fifteen minutes (Schroder 1980: 78).

In this context, the word "range" is generally defined as the firing of torpedoes through an underwater proving ground (also called a range) to determine their performance under "real" (as opposed to laboratory or shop) conditions. All torpedoes intended for issuance to the fleet during the war were tested in this manner. Both during the war and afterward, experimental models and standard models containing experimental features devised by the Torpedo Station's research and development facilities were also proofed from the firing pier.

Activities on the firing pier and on the range were coordinated from the pier's third and fourth levels, which enjoyed unobstructed views across the range north of the island. Barges and yard freighters (known as YFs) conveyed torpedoes from the mainland to Gould Island. In the huge shop building, the torpedoes were made ready for proving. They were then conveyed, either on hand-powered "torpedo carts," or gasoline-powered carriers called "Hansons" after the manufacturer, to the firing pier through the metal-clad frame approach which not only sheltered personnel and material from the elements but also, during the war, permitted movement in nighttime blackout conditions (Belanger, personal communication; Burke, personal communication). At the north end of the pier, a torpedo would be maneuvered by hoist from the carrier onto a roller tray positioned immediately to the rear of one of the deck tubes. At this point, "Ulan gear", containing a gyroscope and "depth and roll" indicator, was inserted into the torpedo. From the roller tray, the torpedo was then winched into the tube and fired.

There was provision on the firing pier for launching from three different types of tubes, all of which were powered by compressed air. Tubes mounted on the concrete floor of the first level were used to approximate firing from the deck of a ship (e.g. destroyer). Submersible tubes positioned on the open elevator platforms on the two exterior towers simulated underwater launching from submarines, with a low firing position of 45 feet below mean low water. (These tubes could also operate in a "deck" mode, as the elevators were capable of raising them to a high firing position 25 feet above mean low water). The launching of torpedoes from aircraft was simulated by means of a drop rack mounted on one of the towers (Anonymous, n.d.). The course of a torpedo fired through the range was visually followed by observers in small craft during daylight operations. At night, seaplanes from the south end of the island provided aerial observation, particularly for the electric-powered torpedoes which, lacking the telltale wake, were equipped with lamps during ranging (Belanger, personal communication). "Sound boats" were also positioned at various locations across the range, to monitor noise produced by the torpedo during its run (Burke, personal communication).

Torpedoes undergoing range trials were fitted not with explosive heads but with "exercise heads" filled with water to achieve the weight of a fully-armed torpedo. At the end of the test run, a pressure mechanism expelled the water from the exercise head, giving the torpedo sufficient buoyancy so that it could be retrieved (Burke, personal communication). Special craft brought the spent torpedoes back to the recovery pier along the east side of the firing pier. Jib cranes maneuvered the torpedoes from the boats onto the pier. The gyroscopes and depth and roll indicators were removed for performance evaluation, and the torpedoes returned to the shop, either for repairs (if they were damaged or had failed a range test) or for final overhaul before storage and ultimate issuance to the fleet.

A booklet highlighting activities at the Naval Underwater Ordnance Station (as the Torpedo Station was known between 1951 and 1966) provides this description of ranging at Gould Island during the postwar years (Anonymous, n.d.):

The torpedo range itself is acoustically instrumented to 10,000 yards combining three underwater recording systems, TRT (torpedo ranging and tracking), Hycor (hyperbolic coordinate), and noise measurement. By means of these systems such data as speed, running depth, deflection, acceleration, turning radius, reach, advance and noise levels may be obtained. Hydrophones are used in all three methods.

...Recording on these torpedo runs is not confined to external measurement. Within the torpedo itself are numerous measuring devices made by the Station's Instrumentation Branch. By means of these devices, data on pitch, roll, depth, fuel flow and pendulum, rudder and elevator positions can be gathered. Such data are used to determine torpedo performance or causes of failures in torpedo runs and to shape a more efficient torpedo...

The Gould Island firing pier is a specially constructed building...Here [the] torpedo is given final preparation for ranging. In a large observation room on the fourth floor of the building there are telescopes, rangefinders and acoustic recording instruments. As the torpedo speeds out of the firing pier tube, radio transmitters go into action here giving information to retrieving craft and observation aircraft. The pier recording instruments receive data from the three underwater systems as the torpedo's signals are received by the latter and amplified for pier reception...

There are also at the pier berthing facilities for retrievers, supply craft and submarines. The retrieving craft are specially constructed to facilitate hauling aboard torpedoes after range runs...

The importance of the firing pier in the Navy's torpedo testing programs declined over the 1960s and 1970s. This was partly due to the establishment of new deep-water ranges off the Bahamas and at Keyport, Washington, capable of testing torpedoes at the increased depths made possible by improvements to submarines. It was also due in part to increasing use of computers in torpedo design: until the 1970s, the torpedo was essentially an "artisan weapon," developed and tested by trial and error. With computers and, eventually, computer-aided design, there emerged a body of theoretical information that could be used to predict the performance of a torpedo or torpedo component with considerable accuracy without the need for extensive field trials (Burke, personal communication). As a result of such developments, the Gould Island complex became increasingly obsolete and was gradually abandoned. The continued, if partial, maintenance of the firing pier over the past two decades has been due entirely to the presence of the elevators, which accommodate the occasional range test as need arises.

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NUWC Drawing Files

various Blueprint and blackline reproductions of original and subsequent design drawings for Building 35 and related structures. On file at Facilities Office, Building 1273, NUWC, Division Newport, and at Engineering Office, Building 1, Naval Education and Training Center, Newport, Rhode Island.

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